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Privatising climate adaptation: How insurance weakens solidaristic and collective disaster recovery

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Abstract

As losses from extreme weather events grow, many governments are looking to privatise the financing and incentivisation of climate adaptation through insurance markets. In a pure market approach to insurance for extreme weather events, individuals become responsible for ensuring they are adequately covered for risks to their own properties, and governments no longer contribute funds to post-disaster recovery. Theoretically, insurance premiums signal the level of risk faced by each household, and incentivise homeowners to invest in adaptive action, such as retrofitting, or drainage work, to reduce premiums. Where risk is considered too high by insurance markets, housing is devalued, in theory leading to retreat from risky areas. In this paper we evaluate the suitability of private insurance as a mechanism for climate adaptation at a household and community level. We find a mismatch between social understandings of responsibility for climate risks, and the technocratic, market-based home insurance products offered by private insurance markets. We suggest that by constructing increasingly individualised, technical and calculative evaluations of risk, market-based models of insurance for extreme weather events erode the solidaristic and collective discourses and practices that support adaptive behaviour.

Keywords: insurance, climate change, disaster, adaptation, social legitimacy, extreme weather.

Graphical/Visual Abstract and Caption

Home insurance premiums based on individual risk are meant to incentivise adaptation, but can undermine collective efforts to adapt to climate change.

1. INTRODUCTION

In market-based economies, private home insurance is becoming increasingly normalised as a market-based mechanism to enable and incentivise individual adaptation to climate change (Booth & Tranter, 2017; King et al., 2013; Porrini & Schwarze, 2014). This can be seen, for example, in policy preferences for private, autonomous adaptation expressed by the Council of Australian Governments (McDonald, 2014), shifts in the rhetoric of UK governments from managing floodwaters to managing the behaviour of individuals at risk (Butler & Pidgeon, 2011), and a focus on private insurance as a climate adaptation strategy endorsed by the EU (European Commission, 2018). Proponents argue that private insurance premiums send a price signal reflecting an objective measurement of risk to households, and thus incentivise individual risk management. Governments, in turn, see this as a way of reducing the burden on taxpayers of the rising cost of disasters caused by extreme weather events (e.g. European Commission, 2018; National Working Group on Financial Risk of Flooding, 2019; Productivity Commission, 2014; Surminski, 2018). However, some scholars argue that home insurance is inherently maladaptive; that it systemically seeks to restore, rather than transform the *status quo,* and is not fit-for-purpose in an age of rapid climatic change (O'Hare et al., 2016; Wamsler & Lawson, 2011).

The insurance sector is also instrumental in the shift to a market approach to adaptation. Large reinsurers, such as Munich Re, represent themselves in a pseudo-governmental role in relation to climate risk – as proactive in the face of government inaction, as a repository for natural disaster data, innovator of risk and climate solutions, and on the front foot with regards to climate mitigation (Lehtonen, 2017). Insurers also partner with the United Nations, governments and non-government organisations in developing and distributing new insurance products, for example, micro-insurance to subsistence farmers in the Global South (Johnson, 2013) and public flood insurance schemes in the United Kingdom and the United States (McAneney et al., 2016).

In this paper, our aim is to review the literature pertaining to the role of private insurance in climate adaptation, and critically discuss the adequacy of insurance in achieving adaptation outcomes. We begin by describing how market approaches to extreme weather disasters are becoming mobilised as a mechanism for climate adaptation, as can be seen in the case of Australia. We then describe how this disrupts and re-constitutes existing discourses of responsibility, risk and equitability in relation to adaptation. In critically evaluating the argument for pure market approaches to climate adaptation, we find a mismatch between social understandings of responsibility for climate risks, and the technocratic, market-based products offered by private insurance markets. We suggest that by constructing increasingly individualised, technical and calculative evaluations of risk, market-based models of insurance for extreme weather events undermine the solidaristic and collective discourses and practices that support adaptive behaviour.

Underpinning our critical review and subsequent discussion, is a relational theorisation in which co-constitution and embedded power dynamics are foregrounded. For example, we understand extreme weather events such as floods, storms and wildfires as complexly constituted through social discourses and practices, rather than as purely 'natural' disasters (Stott et al., 2016). These events are, in part, a product of carbon emissions by fossil fuel corporations and associated industries, population increases and wealth accumulation in areas prone to disasters, lack of government action and regulation regarding climate risks, and/or consumption of climate unfriendly products and services. Such drivers could be seen as contributing to a collective issue, and thus a collective responsibility. However, the shift towards individualisation and privatisation of risk in market-based economies means that responsibility for climate-exacerbated events is now highly contested (Adger et al., 2013). Adaptation approaches – as we foreground in this paper – reflect the interdependent co-constituting relationships between individuals and institutions such as governments and insurers that are central to ensuring effectiveness and equitability (Adger, 2003). Thus, in this paper, we are careful not to assume linear causal relationships in relation to decision-making, risk, responsibility and the adequacy of insurance.

2. MARKET APPROACHES TO INSURANCE AND DISASTERS

Before the twentieth century, western societies did not have an institutionalised mechanism for dealing with damaging events where no individual was clearly to blame (Ewald, 1991). The logic of the twentieth century welfare state drew on the realisation that events such as traffic or factory accidents, while individually unexpected, can be anticipated in terms of probability statistics (Ewald, 1991). These accidents were seen as inevitable results of activities undertaken for the good of society, and thus as a collective responsibility. As Lehtonen and Liukko (2011, p. 37) observe, damaging events were "seen to be due to the functioning of society as a whole and the relations

between people, not to single intentional or careless acts." In the welfare state, individuals' rights included protection by governments from the consequences of damaging events. Since the late twentieth century, the welfare state has been incrementally replaced by forms of governmentality in which risks are borne individually, rather than collectively (Maurer, 1999).

Giddens (1990, 1991) and Beck (1992) see the privatisation of risk as not just a symptom of modern life but a method of systemic individualisation, 'disembedding' individuals from the certainty of membership of collectives such as churches, political parties, industries and nation states (Giddens, 1990). Through 'the ideology of privatization' (Bauman, 2008) collective forms of action are condemned for undermining individual freedom of choice. Responsibility for global and collective risks such as climate change have thus become individualised through discourses of consumption, while the structures of social, corporate and political institutions simultaneously limit the power of individuals to address such risks (Norgaard, 2017; Shove, 2010). In this reading of neoliberal governmentality, the state is now a system "that calculates and then disburses not the national product but the national risk across the population in order to defer capitalist crises, and also in order to regulate populations" (Maurer, 1999, pp. 384–385). Reliance on the private sector for climate adaptation can thus be seen as neoliberal shift toward individualisation of risk, or responsibilisation through which collective social problems are reframed as the product of individual choices (Box et al., 2016; McLennan & Handmer, 2012).

'Pure' market approaches to insurance for extreme weather events aim to eliminate the need for governments to provide financial support either in underwriting private insurance, as insurer of last resort, or through post-disaster payments. The Geneva Association, an insurance industry-backed economic research association, argue that:

> Traditional post-disaster financial assistance is proving ineffective and insufficient, dis-incentivising people, businesses and local governments from taking proactive action to manage their risks. Increasingly, governments are recognising the role and benefits of a market-based insurance industry in carrying and transferring risk. (Geneva Association, 2018, p. 7).

Writing for the European Investment Bank, Konrad and Thum (2012, p. 18) argue that there is no need for government intervention in private insurance markets:

> Even the observation that insurance is not available in some cases or that insurance premiums are not affordable for some customers is not necessarily a sign of market failure… Any attempt to reduce insurance premiums through government intervention can distort the allocative role of insurance markets.

An Australian Government inquiry into the cost of natural disasters (Productivity Commission, 2014, p. 414), similarly argued that "Governments should not address affordability concerns by providing subsidies, especially to high-risk households. Subsidies reduce the effectiveness of insurance in communicating and managing risk."

In traditional models of insurance, policies 'mutualised' or distributed the cost of high-risk properties among the wider pool of lower-risk insured households, in order to keep insurance affordable, and encourage greater uptake. However, insurers are moving away from this model, as according to free-market logic, "high premiums may simply reflect high risks and, therefore, will be useful market signals" (Konrad & Thum, 2012, p. 18). Using 'risk-reflective' pricing (also known as risk-based, risk-

rated, or actuarial pricing) premiums are calculated on the basis of specific and localised risk scenarios, which are supported by hazard mapping and assessment of infrastructure and the nature of the home. Proponents of market-based private insurance argue the incentive of lower premiums encourages risk mitigation and adaptive action, and also limits development in high risk areas (Ben-Shahar & Logue, 2015). Calculating risk individually is seen as economically more efficient for insurers than mutualisation of premiums, as it avoids 'adverse selection': attracting more high-risk customers, and deterring lower-risk customers (Rees & Wambach, 2008). Because it creates price differences between high and low risk households,risk-reflective pricing is believed to incentivise adaptive behaviour to reduce risk (Harwood et al., 2016; Hudson et al., 2016). Premiums should be unsubsidised by governments, whose funds will then be freed up for adaptation of essential infrastructure (National Working Group on Financial Risk of Flooding, 2019). Individuals' willingness to pay high premiums should not be undermined by the possibility of taxpayer funded post-disaster pay-outs (Roche et al., 2010).

As an example, Australia has the closest to what could be called a 'pure' market approach to insurance for extreme weather events (Christophers, 2019). Australia has historically faced a high level of extreme weather disaster events, which are growing in frequency and intensity due to climate change (Steffen et al., 2019). Unlike countries such as France or Spain, there is no government guaranteed, mutualised catastrophe insurance. Neither does Australia have government-subsidised insurance programs for flood such as those in the US and UK. Private insurance for storm damage and bushfire is widely available through standard home insurance policies. Flood is often included as an option attracting extra cost. There is currently no cover for the effects of erosion from sea level rise (Banhalmi-Zakar et al., 2016). Following disasters, the Australian Government often provides one-off payments to those affected, largely because of shortfalls in private insurance (Institute of Actuaries of Australia, 2011). In times of disaster, it is politically expedient to be seen to help those in need. This is against the advice of advocates of the pure market approach, who see this as distorting the market by undermining people's willingness to purchase insurance (Geneva Association, 2018). However, as the Insurance Council of Australia (2014, p. 4) notes, government payments offered are insufficient to restore such losses, and so do little to distort markets. Neither do insurance payments fund adaptive action at a household level through upgrading housing: this is often challenged by insurers, as it contradicts the common insurance principle of 'no betterment'. This means that no property improvement should be gained by the insured: the nature of the insurance transaction is to reinstate property to its original condition, rather than upgrading it (de Vet et al., 2019; O'Hare et al., 2016). Insurers are starting to engage with the potential benefits of adaptive retrofitting, and there is opportunity for insurers to reduce premiums where risk is reduced by proactive adaptation, but this is not yet widely practiced (CRO Forum, 2019). Rather, adherence to the no betterment principle is still a common complaint made by Australian households recovering from disaster (de Vet et al., 2019).

A number of flood, cyclone and bushfire disasters in which large numbers of householders have been the victims of inadequate insurance cover have prompted calls for government intervention in insurance markets. This occurred in 1974, following floods in Brisbane, after which the government of the time gave provisional support to a National Disaster Insurance Scheme in which the federal government would provide reinsurance to a private insurance pool (Mason, 2011). In 2011, after extensive flooding in south eastern Australia, a Natural Disaster Insurance Review also recommended mandatory flood insurance, with discounted premiums for flood insurance for people

in medium to high risk areas, supported by a government reinsurance scheme (Trowbridge et al., 2011). In 2015, a Federal Treasury Taskforce into escalating insurance premiums in Northern Australia investigated options for government-backed mutualisation or reinsurance funds for cyclone risk. In 2017, the Australian Competition and Consumer Commission began a further inquiry into rapid premium increases for cyclone risk in Northern Australia. They found that insurers are deliberately raising premiums to discourage customers in high risk areas (Australian Competition and Consumer Commission, 2019). This inquiry is currently investigating, once again, options for government-sponsored reinsurance pools. However, these kinds of approaches have been invariably resisted or rejected in favour of pure market approaches (e.g. Mason, 2011; Tooth, 2012; Australian Government, 2015)[i].

According to the Federal Treasury, successive governments have concluded that a "clear market failure" such as "where insurance is not being offered because insurers cannot price appropriately or where consumers are unable to access insurance for an affordable price" would be necessary for government intervention in the form of subsidy or reinsurance (Australian Government The Treasury, 2018, p. 4). However, the experience of many Australians – and the evidence of multiple public inquiries – attests to both of these conditions being met. Despite insurers' unfettered ability to set prices which, in theory, should avoid adverse selection of too many high risk compared to low risk policies, some areas have been described as effectively uninsurable (Australian Government, 2015). Insurance products available to Australians are highly variable and the extent to which risks are covered is most often opaque to insurance customers (Bell, 2011; Fels & Cousins, 2019). Risk-reflective pricing is practiced by Australian insurers, but a lack of information about how premiums are calculated means that in practice they are poor signals of changes in risk. Despite pressure from consumer watchdogs, insurers have expressed reluctance to disclose how premiums are calculated to their customers (Australian Competition and Consumer Commission, 2019).

These observations regarding 'pure' market approaches also resonate with the role of insurance in climate adaptation in Australia. The New South Wales Insurance Monitors (Fels & Cousins, 2019) report that significant investments by insurance customers in mitigating risks of storms, floods or fires does not commensurately reduce their insurance premiums. In other words, risk-reflexive pricing is not acting as an incentive for adaptation in the Australian context, and disadvantaged communities are being priced out of protection against climate-related disasters. The Australian insurance industry is highly critical of a lack of alternative funding arrangements for climate adaptation and mitigation, which increases insurers' level of risk. A Productivity Commission Inquiry into Natural Disaster Funding Arrangements (2014) recommended significant government investment into adaptation, but this was rejected by the then Federal government. Currently, 97 per cent of federal disaster funding is used to recovery, and only 3 per cent in adaptation (Insurance Council of Australia, 2019).

3. RESPONSIBILITY FOR CLIMATE ADAPTATION

Climate adaptation involves making adjustments to the *status quo* in response to experienced or anticipated stresses to ecological, social and economic systems (Smit et al., 2000). Adaptive actions occur across scales and are taken in the context of institutional, regulatory, economic, corporate, technological and cultural drivers and barriers (Adger et al., 2005). Adaptation may be incremental – maintaining the essence and integrity of an existing system, or transformational – fundamentally

changing that system (Kates et al., 2012). National and local government adaptation policies are important in framing the conditions for individuals to undertake adaptive action, as well as defining public adaptation work where individual action is insufficient (Intergovernmental Panel on Climate Change (IPCC), 2014; UNISDR, 2009). A key question for climate adaptation is how states, the private sector, communities and householders understand their roles and responsibilities for living with and adapting to risks imposed by other actants, including climatic events.

For homeowners, adaptation to climate change often means mitigating the risk of extreme weather events, either proactively before a disaster strikes, or reactively after the property has been damaged. Adaptation could involve retrofitting their house with better drainage, more efficient heating and cooling systems, or ember-proofing to mitigate the risks of flood, heatwave or fire. Adaptation may also require householders to negotiate changes on land outside of their own property, for example where vegetation on land owned by others creates a fire hazard, where insufficient road drainage creates a flood risk, or where the construction of coastal defences leads to erosion further along the shore. Where risks become impossible to mitigate, such as in areas of dangerous coastal erosion, or where floods become annual events, adaptation may necessitate retreat without the option of reselling. Each of these adaptive actions involve understanding risk, evaluating what action is appropriate, financial commitments, regulatory considerations, and community support. None of these are straightforward, and all involve value judgements that are socially contingent, rather than technically calculable (Adger et al., 2005). Thus, the interdependent relationships between individuals and institutions (such as governments and insurers) are central to the effectiveness and equitability of climate adaptation (Adger, 2003).

The idea of 'shared responsibility' for the impacts of extreme weather events is written into both disaster management and adaptation policies of liberal democracies across the globe (e.g. Box et al., 2016; McLennan & Handmer, 2012). In a general sense, to have responsibility implies three things: an obligation in law or natural justice for which one may be held accountable; the ability or power with which to act; and also an expectation of care (Bickerstaff & Walker, 2002; Kent, 2012). In shared responsibility discourse, governments at multiple scales, community organisations, the private sector and individuals are each understood to have some degree of responsibility for preparing for and responding to climate-related disaster events. Shared responsibility is, in part, a reaction to top-down approaches to disaster management, in which decisions were traditionally made by government agencies with minimal community consultation (Scolobig et al., 2015). It recognises that community capacity and engagement are vital to resilience and adaptation (Adger et al., 2011). Sharing responsibility for risk can be said to be adaptive, where it distributes risk across society, enabling individuals to act collectively, potentially giving legitimacy to adaptation decisions, and providing protection to vulnerable households (Adger 2003).

In the context of the neoliberal shift toward individualisation and privatisation of responsibility for risk, reflecting the withdrawal of the welfare state, discourses of shared responsibility also invoke market-based self-responsibilisation approaches (N. Barnett, 2003). This includes the expectation by governments that households are responsible for adequately insuring against their own localised risks. Governments variously use regulations, subsidies, state-run insurance, public/private partnerships and education campaigns in order to encourage adequate levels of insurance cover. However, there is increasing emphasis on pure market models of insurance for natural disasters as the most efficient process of achieving adaptive behaviour (Lobo-Guerrero, 2010).

However, perceptions of how responsibility is shared often differ between householders, governments and insurers (Adger et al., 2013). For governments, householder 'underinsurance' (not being insured for the total value of all property), lack of cover for specific extreme weather events, and decisions not to insure are framed not only as moral failures, but also as evidence of irrationality – an incapacity to grasp the consequences of risks that are seen as distant and unlikely (Botzen & van den Bergh, 2009; Schwarze et al., 2011). In this framing, technocratic insurance instruments are objectively beneficial, and governments and insurers rational and benign. Governments and insurers therefore see their responsibility not as providing physical and financial protection against climatic risks, but ensuring sufficient information and risk-signalling to persuade householders to increase their private insurance cover.

For householders, there is an affective dimension to their understanding of the 'promise' of insurance, or expectation of care, that is not present in market or regulatory logics (McFall, 2011). Fairness, solidarity, equitability, and protection of the vulnerable have been identified as fundamental to the social legitimacy of adaptation policy and action (Adger, 2016). Booth and Harwood (2016) found that for insured people living in an area of high wildfire risk, while the threat of fire was ever-present, the calculative logics of insurance technologies were distant and opaque. In contrast, the value of household belongings was emotionally constituted, and hence not everything within the home was deemed worthy of insuring. This disjunction contributed to uneasy trade-offs between the financial necessity of insurance when living in a dangerous area, and non-financial considerations. These included adherence to – or revolt against – the social norm of being insured, and the incommensurability of the monetary and affective value of possessions. Risk-awareness, as promoted by governments and insurers, has little bearing on decisions about insurance (Bubeck et al., 2012).

Differences in understandings of the division of responsibility between insurers, government agencies and the insured can have multiple negative outcomes. In a Canadian study, Oulahen et al (2015) found that residents believed that governments should take primary responsibility for reducing the impact of natural hazards, while insurance companies were perceived to have lower levels of responsibility. In practice, insurers failed to meet even these community expectations. In studies where communities describe governments and insurers as failing to provide the protections they have promised, this perceived failure leads to feelings of helplessness that made individuals less likely to take adaptive action (Adger et al., 2013). Governments and insurers routinely fail to meet public expectations of their responsibilities when extreme weather events occur. For instance, Kammerbauer and Wamsler (2017) describe how disputes between insurers and government assessors after a flood event in Bavaria, Germany in 2013, led to a breakdown in responsibility sharing. Insured homeowners were unable to cover the cost of rebuilding, while governments funded the rebuilding of uninsured flooded property through disaster recovery spending.

Insured people who have experienced disasters previously are less likely to believe that insurance is an adequate substitute for other forms of adaptation (Harries, 2012). While there is evidence that householders who are motivated to act themselves to take responsibility for mitigating, adapting and responding to extreme weather events are likely to be more resilient (Prior & Eriksen, 2012), the decision to purchase insurance may not contribute to this outcome. Indeed, studies in Australia and the UK have found that uninsured people often recover better, because they have built strong social networks in place of reliance on insurance (Keogh et al., 2011; Wamsler & Lawson, 2011). As O'Hare

et al. (2016) observe, householders can be disempowered after a disaster event as insurers take control of properties and control repairs, and do not necessarily facilitate adaptive mitigation measures. This sits within the context of an already existing imbalance of power between the insurer and the insuree, with the latter carrying the moral burden of obligation when it comes to disclosure and accountability (Lobo-Guerrero, 2010, 2013). Such imbalances constitute a relationship of 'fatalistic dependency' on behalf of householders, who in the absence of trust, still have little choice but to rely on their insurer to act ethically (Tranter & Booth, 2019). These examples underscore the importance of ethical considerations in climate adaptation policy. The social context, including place values (Agyeman et al., 2009), identity (Brown et al., 2019), agency and self-efficacy (Adger et al., 2009), and capacity and networks (Scolobig et al., 2015) are vital elements of adaptation that are missing from technocratic and market-focussed policies.

4. PROBLEMATIC PRIVATISATION OF CLIMATE ADAPTATION

Governments in market-based economies have identified a pure market insurance model as the optimal arrangement for encouraging and financing climate adaptation at a household level. In addition to the example provided above from Australia, in the US, the longstanding National Flood Insurance Program (NFIP)[ii] was reformed in 2012 to eliminate subsidies and impose full risk-reflective pricing (Knowles & Kunreuther, 2014). Imposing risk-reflective pricing had an immediate negative effect on the prices of housing in high risk areas. Areas containing high proportions of poor people and racial minorities were disproportionately affected by the slump in property prices (Nance, 2015). Higher insurance prices relative to property value made it less likely that these houses would be insured, and the loss of capital made retrofitting untenable. A political backlash against these reforms led to them being dialled back in 2014, but the goal of the NFIP remains unsubsidised risk-reflective pricing. Under new arrangements, householders can expect their premiums to rise by up to 18 per cent a year, and subsidies are means-tested (Elliott, 2017). As Elliot (2017, p. 27) states:

> … the core presumptions [of the reformed NFIP] are that individuals are the source of risk and that greater individual responsibility on the part of those facing high risk, expressed as a form of market-based financial decision making, will most effectively manage our relationship to catastrophe.

In the UK, Flood Re, a not-for-profit insurance pool, was developed by the insurance industry and backed by government legislation, launching in 2016. It was created in response to the insurance industry finding itself unable to cover increasing flood risk, in a market context in which new insurers offered cheap insurance to low-risk customers, creating a problem of adverse selection (Penning-Rowsell et al., 2014). Insurers of high flood risk households can cede cover for those households to Flood Re, at a discounted price. This is funded by a subsidy paid by all insurers, that is passed on to all policy-holders (Surminski, 2018). In this way, the whole pool of insured households continues to fund high risk households. Flood Re is described as a 'cushion' for high risk households, subsidising flood insurance in the short-term, but paving the way for fully risk-reflective pricing (Surminski, 2018). However, it lacks any direct means of encouraging adaptive behaviour, or any process for transition to a pure market for flood insurance (Surminski & Eldridge, 2017). Christophers (2019) refers to Flood Re as an example of 'the allusive market': a stop-gap measure whose role is to generate the expectation of a pure market to follow. In doing so, it delimits the options for dealing

with flood risk to those relating to the pure market, and shuts out consideration of non-market solutions (Christophers, 2019).

These kinds of approaches are part of neoliberal governmentality in which individuals are positioned as responsible for climate change and best-placed to meet risk challenges through personal, private-sphere behaviour framed as consumer choices (Kent, 2009). There are significant drawbacks to this strategy. Fundamentally, the insurance industry is not primarily concerned with climate adaptation, but must balance the sometimes contradictory objectives of retaining social legitimacy, negotiating government regulation, and generating profit for shareholders. The private insurance sector has profitability as its primary mandate (Savitt, 2017), meaning that insurers cannot make losses from extreme weather events without recouping them from elsewhere. As McAneney et al. (2013) observe, in a purely market-based system, competition between private insurers can have unequal and inequitable consequences. To insure high risk properties, they must either price according to individualised measures of risk (risk-reflective pricing), cross-subsidise from other insured properties (mutualisation) or seek government subsidy. Where governments decline to subsidise, but also put pressure on insurers to make insurance universally available, a central problem for insurers is how to price risk to households fairly. To maintain consumer trust, the calculation of individual premiums must be seen to be legitimate. This is particularly important in pure private insurance models of climate adaptation. Where individuals can no longer expect protection by the state, the ability of households to have access to affordable insurance becomes vital to their ability to recover financially from extreme weather damage to their homes.

Traditional, mutualised risk pools that distribute the cost of high-risk properties across the pool can be unfair. A number of studies point to examples of wealthy, insured residents choosing to live in attractive, but high-risk locations, being subsidized by other, less affluent policy-holders as a result of mutualised insurance pools (e.g. Oulahen et al., 2015; Roberts, 2013). Mutualisation in order to keep premiums low has also been blamed for encouraging housing development in high risk areas (Cutter et al., 2018). However, as the examples from the US and UK flood insurance have shown, insurers return to mutualisation when the politics of risk-reflective pricing become challenging.

Insurers increasingly measure and price risk on an individualised basis, as technologies to measure and predict the localised behaviour of floodwater, storm surge, wind and fire become more widely available. Risk-reflective pricing can make insurance prohibitively expensive for people on middle to low incomes living in high risk areas (Penning-Rowsell & Pardoe, 2015). This can lead to the most vulnerable becoming the least insured (Duus-Otterström & Jagers, 2011). In some cases, vulnerability can become entrenched in ghettos of uninsurable housing in high risk areas (Gearing, 2018; King et al., 2013). Johnson (2015) further suggests that the insurance industry uses large-scale extreme weather events as an opportunity to re-calibrate risk modelling and further increase premiums for high risk areas, leading to what she calls ‘splintering protectionism’ in which the property of the affluent is secured against loss, while the vulnerable are left to hope for ad hoc disaster relief by governments. Affordable or not, there is currently little empirical evidence to support the effectiveness of risk-reflective pricing as a risk signal (McAneney et al., 2013), or risk perception as a driver of insurance purchase (Bubeck et al., 2012). In fact, social norms and community expectations are more likely to lead to adaptive action than risk perceptions or economic factors (Lo, 2013a, 2013b).

Risk-reflective insurance pricing has become the 'conventional wisdom' for economists, as it conforms to a neoliberal imaginary of scientific rationalism and economic efficiency (Wright & Nyberg, 2014). As such, it fits easily with existing technocratic instruments of climate adaptation embedded in many institutions. Such instruments often assume economic rationalist modes of thinking that foreground respect for authority, stability and preservation of the *status quo* (Adger et al., 2017). One example is the UK Government's adaptation policy, which has been criticised for its reliance on reductive scientific methodologies for the assessment of climate risk (Howarth et al., 2018). The normalisation and normatisation of risk-reflective pricing conceals assumptions about market responses to risk as the natural solution to climate problems, and masks the political agenda of insurance as the preferred mechanism for climate adaptation (Weinkle, 2019).

The rise of home insurance as the predominant form of protection against extreme weather events and other natural disasters is a consequence of decisions by neoliberal governments to step back from responsibility for disaster management as a duty of the state, transferring the financial burden from taxation to private insurance of financialised individuals (Johnson, 2013). It casts adaptive action as a consumer, rather than a citizen behaviour, shifting the focus of responsibility for climate action from citizen/state to consumer/market (O'Hare et al., 2016). By placing total responsibility for the risk on the homeowner, it negates the responsibility for increased climate risk borne by corporate emitters of greenhouse gases, and the responsibility of governments for fair regulation of and protection from these impacts (Cuomo, 2011). Insurance sustains the *status quo*, both literally by returning buildings to their original state, and discursively, by enshrining free market solutions as the answer to climate change (O'Hare et al., 2016). As Wright and Nyberg (2014, p. 10) put it: "market-based solutions [to climate change] suggest that any unintended consequences will be dealt with as 'market failures', not as a failure of the 'market society'."

It is important to note the "creeping privatisation of social welfare" (French & Kneale, 2009, p. 1030) which is a political and ideological move, rather than a natural, or common sense process. The means through which climate adaptation is becoming privatised in countries such as the US, UK and Australia are obscured through the technologies of market insurance, and the close relationships of insurers to governments. As Penning-Rowsell et al. (2014, p. 695) point out, study of insurance is methodologically problematic, in part because "'commercial sensitivities' – real or invented – surround the insurance industry." Fundamentally, reliance on private insurance narrows the field of options for adapting to climate change. The dangers of this are clearly described by Millward-Hopkins (2016, p. 15):

> On this path, self- interest, technocratic governmentality, and techno- logical solutions overshadow collective action and voices challenging fundamental contradictions between low-carbon transitions and growth-reliant consumer society. Consequently, an illusion emerges that there are limits to society's capacity for adaptation, when in reality such limits are culturally and ideologically contingent.

Is private insurance necessary for climate adaptation? While there is a global trend toward pure market approaches, some countries eschew private insurance for extreme weather events, and maintain an approach grounded in welfare and solidarity. In Belgium, France, Italy, Spain, and the Netherlands, government compensation for disaster impacts is still seen as a fundamental right of individuals (Monti, 2009). International funds such as the Green Climate Fund set up under the UNFCCC support climate adaptation in developing countries (Hulme et al., 2012). International

funds, such as the EU Solidarity Fund that was established after major flooding across Europe in 2002, are also an opportunity for financing adaptation (Aakre et al., 2010). In countries with large Muslim populations, alternative forms of not-for-profit household insurance that conform to Islamic prohibitions of usury, focus on solidarity, rather than individualised risk. 'Takaful', from the Arabic word 'kafal' meaning to take care of one another's needs (Swartz & Coetzer, 2010) is understood as an insurance instrument that works for the benefit of a social group, rather than a contract between an individual and an insurance company (Baker, 2002).

5. CONCLUSION

The complex and multi-scalar interaction of human and non-human actants involved in climate change mean that it is often hard to evaluate the success of actions, which can prove adaptive in one context and maladaptive in another. Maladaptive actions, while aiming to reduce vulnerability to climate change, "impact adversely on, or increase… the vulnerability of other systems, sectors or social groups." (J. Barnett & O'Neill, 2010, p. 211) Maladaptations may place disproportionate burden on the most vulnerable in society, reduce incentives to adapt, or reduce future opportunities to adapt, for instance by creating path dependency. Whether an action is evaluated as adaptive or maladaptive is therefore highly subjective, dependent on the positionality and values of those involved and affected by it (Adger et al., 2005). For this reason, it is important to include the perspectives and experiences of a wide range of stakeholders in evaluating the suitability of policy framings for adaptation. Studies increasingly advocate a co-production approach to adaptation as a way of valuing lay knowledge, and including public participation in climate governance (Howarth et al., 2018; Sarzynski, 2015; Wamsler, 2016).

The growth of pure market insurance is an example of an approach that, while considered adaptive by many governments, can be seen as maladaptive in its effect on vulnerable communities, and its emphasis on individualising risk at the cost of collective action. Pure market approaches to adaptation may be financially efficient and actuarily sound, and thus considered apt based on a narrow range of criteria, but appear incommensurable with the principles of fairness, solidarity, equitability, and protection of the vulnerable that have been identified as essential in the social science literature on climate adaptation (Adger, 2016). On the contrary, pure market insurance models of climate adaptation leave the most vulnerable and those at highest risk of extreme weather events unprotected, by refusing them insurance even as risk-reflective premiums reduce the value of their property. This is not to say that people living in places of high risk should be subsidised to stay there. Rather, that market approaches individualise risk where collective and solidaristic responses may be more appropriate and effective. Framing insurance as the best means of climate adaptation privileges technocratic and economic rationalist ways of being and knowing, while devaluing lay knowledge, the importance of community and non-financial forms of adaptation. As Adger et al. (2017, p. 373) observe, "economic rationality is limited in its ability to produce optimal environmental outcomes, even in the circumstances of perfect markets and perfect information."

There are many reasons to assume that a pure market approach is unlikely to generate good outcomes for climate adaptation environmentally or socially. Existing insurance markets and available information for adaptation are both far from perfect (Stern, 2006). Underinsurance and insurance unavailability or unaffordability are widespread, and trust in insurers is low (Tranter &

Booth, 2019). Localised effects of climate change are complex, and adaptation action is often the subject of political disagreement, so reliance on private interests may not lead to fair or legitimate outcomes (Adger et al., 2012). Risk-reflective pricing is limited in its effectiveness as an incentive to adapt because social values, rather than economic values, are more likely to affect people's willingness to act on climate change (Evans et al., 2012; Lucas, 2018). Without reference to social values and context, technocratic forms of risk measurement and calculation make trade-offs based on limited information. For example, loss of biodiversity or cultural heritage is not offset by economic gains, as these sets of values are incommensurable (Adger, 2016). Fundamentally, successful adaptation hinges on our capacity to work together as a society, and dependence on individualised insurance limits that capacity.

Lehtonen and Liukko (2011) argue that aspects of solidarity and mutual dependency also exist within the private insurance industry, but have become hidden as the sector has become increasingly complex and technologised. While examples such as Takaful, or solidarity funds offer alternative models for insurance and climate adaptation, the proactive approach to climate change being taken by insurers in western democracies including the US, UK and Australia is placing the insurance sector front and centre, while governments step back through individual responsibilisation agendas. Insurance is increasingly the adaptation mechanism of choice for governments, and the insurance sector, it could be argued, is emerging as *the* leader in relation to climate risk. These changes reflect a redistribution of power within market-based economies that warrants further attention, particularly in light of the power imbalances evident in relation to insurance.

Figures and Tables

Figure 1: A family home destroyed in the 2019-20 Australian bushfires. Creative Commons.

https://en.wikipedia.org/wiki/File:Family_home_destroyed.jpg

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[i] At the time of writing, Australia is in the midst of a bushfire crisis that has burned over 10 million hectares, destroying more than 2700 homes. Bushfire (known internationally as wildfire), more than any other form of climatic disaster, is likely to lead to total loss of property, rather than repairable damage (Steuer, 2015). This makes the effect of underinsurance greater, as many people who lose their homes find that their insurance will not cover the cost of rebuilding. In the Black Saturday bushfires of 2009, in which around 2000 homes were destroyed, it was estimated that 80 per cent of those affected who were insured did not have adequate insurance. A further 13 per cent of properties destroyed were not insured at all (Steuer, 2015). Since 2009, Australia has changed building standards for properties in bushfire risk areas, to adapt to this risk. However, compliance with these adaptive standards is expensive, and not included in standard insurance policies (de Vet & Eriksen, 2019).

[ii] The NFIP was instigated in 1968, as a hybrid private/public insurance scheme the stated aim of which was to make flood insurance affordable, giving security and dignity to those impacted by flooding (Elliott, 2017). It was designed to: (a) subsidise insurance premiums in order to shift the majority of disaster relief funding away from reactive post-disaster arrangements; (b) to encourage adaptation by communities to mitigate risks; and (c) to limit development in high risk areas (for reviews of the NFIP see Kousky, 2018; Shively, 2017). By opting into the program, municipalities must commit to mitigation measures and limits to development. Within these areas, all homeowners judged to have a one per cent or greater annual chance of flooding, who have federally-backed mortgages, must purchase NFIP policies. However, in practice the NFIP has failed to live up to its goals, and has been criticised of enabling, rather than limiting, risky development (Cutter et al., 2018). Risk mapping that delineates which communities are eligible, and at what premium price, has also been widely criticised as inadequate (eg. Highfield et al., 2013; Leatherman, 2018).